

Report on the Northern Bottlenose Whale Recovery Workshop June 5, 2007

Prepared by:

D. Millar
Oceans and Coastal Management Division
Oceans and Habitat Branch
Fisheries and Oceans Canada
Maritimes Region
Bedford Institute of Oceanography
P.O. Box 1006
Dartmouth, Nova Scotia B2Y 4A2

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P.O. Box 1006
Dartmouth, Nova Scotia B2Y 4A2

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List of Acronyms

CITES	Convention on International Trade in Endangered Species
CNSOPB	Canada-Nova Scotia Offshore Petroleum Board
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
DFO	Fisheries and Oceans Canada
IUCN	International Union for the Conservation of Nature
MPA	Marine Protected Area
NBW	Northern bottlenose whale
PBR	Potential Biological Removal
RPA	Recovery Potential Assessment
SARA	<i>Species At Risk Act</i>

Acknowledgements

The Oceans and Coastal Management Division would like to thank all of the participants who attended the recovery workshop for northern bottlenose whale. The input provided by participants will be extremely valuable to the recovery process. Special thanks are due to those who gave presentations, helped with organization, recorded minutes and assisted with facilitation.

Executive Summary

The northern bottlenose whale, Scotian Shelf population, was listed as endangered under the *Species at Risk Act* in 2006. Fisheries and Oceans Canada (DFO) is now responsible for developing a strategy for the recovery of this population. A workshop was held on June 5th, 2007 to gather initial multi-sectoral input on the contents of the recovery strategy.

The Scotian Shelf population of northern bottlenose whales numbers approximately 163 individuals and appears to be relatively stable. The whales are thought to be year round residents of the Scotian Shelf, primarily occupying the Gully and two adjacent canyons, Haldimand and Shortland. Important potential threats to the northern bottlenose whale include entanglement, acoustic disturbance and petroleum exploration and development.

DFO has recommended that a stable or increasing population trend, along with maintenance of existing distribution, would be an appropriate recovery target for this population. Participants at the workshop generally supported this target. Objectives related to addressing knowledge gaps, monitoring the population, managing threats and engaging stakeholders have been proposed.

Résumé

La population de baleine à bec commune du plateau néo-écossais a été désignée comme étant en voie de disparition en vertu de la *Loi sur les espèces en péril* en 2006. Pêches et Océans Canada est maintenant chargé d'élaborer un programme de rétablissement de cette population. On a tenu un atelier le 5 juin 2007 dans le but de recueillir des avis multisectoriels sur le contenu de ce programme.

La population de baleine à bec commune du plateau néo-écossais compte environ 163 individus et semble relativement stable. On croit que ces baleines résident à longueur d'année sur le plateau néo-écossais, principalement dans le Gully et dans les deux canyons adjacents, Haldimand et Shortland. L'empêchement dans les engins de pêche, les perturbations acoustiques et les activités de prospection et de mise en valeur du pétrole représentent d'importantes menaces éventuelles pour la baleine à bec commune.

Selon la recommandation du MPO, une tendance à la stabilité ou à l'augmentation de la population ainsi que le maintien de la répartition actuelle de cette dernière constitueraient un bon objectif de rétablissement pour cette population, ce à quoi se sont ralliés en général les participants à l'atelier. Des objectifs visant les lacunes à combler dans les connaissances, la surveillance de la population, la gestion des menaces et la mobilisation des intéressés ont aussi été proposés.

1.0 Introduction

In April of 2006, the Scotian Shelf population of the northern bottlenose whale was listed under the federal *Species at Risk Act* (SARA) as endangered. In accordance with SARA, recovery strategies must be developed for all listed threatened and endangered species, within a designated time period (three years in the case of the northern bottlenose whale). Recovery strategies are intended to act as a blue print for recovery and identify what needs to be done to stop or reverse the decline of a species.

SARA requires that recovery strategies be developed in cooperation with provinces and Aboriginal peoples and in consultation with potentially affected parties. On June 5th, 2007, a workshop was held to solicit input from stakeholders and other interested parties on the development of the recovery strategy. The intention of the workshop was not for workshop participants to reach consensus, but simply to gather a diversity of advice to be considered by DFO as the department develops its recovery strategy for this species.

Background information on the species, its habitat, and limiting factors was communicated at the workshop through a series of presentations. After each presentation, there were opportunities for discussion, and for participants to identify any additional information that they felt should be taken into account. Objectives and strategies for recovery of the species were discussed in small, facilitated group sessions.

Participants included representatives of the fishing, petroleum, and shipping industries; environmental organizations; academic experts; Aboriginal peoples; and government representatives. A list of participants is included as Appendix 1.

2.0 Recovery Strategy Background:

2.1 Presentation

A recovery strategy is a planning document that must be developed to guide the recovery of all threatened and endangered species. It describes the species and its habitat, identifies limiting factors, establishes recovery goals and objectives and broadly outlines the research and management activities that are needed to achieve recovery. Specific actions required to implement the recovery strategy are outlined in a subsequent action plan. The content of the recovery strategy must be consistent with information provided by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), a body of scientific experts that assesses the status of Canadian wildlife species. The deadline for completing a recovery strategy for the northern bottlenose whale is April, 2009.

Recovery strategies under SARA must include:

- A description of the species and its needs;
- An identification of the threats to the species and its habitat that is consistent with information provided by COSEWIC;
- The broad strategy to be taken to address threats;
- An identification of the species' critical habitat, to the extent possible, and examples of activities that are likely to result in its destruction;
- A schedule of studies to identify critical habitat, where available information is inadequate;
- Population and distribution objectives and a general description of the activities needed to meet those objectives;
- A statement of when one or more action plans will be completed.

A range of approaches have been used in the past to develop recovery strategies, depending on the species involved, the scope for potential impacts to stakeholders, and the level of public interest. Where there is relatively little public interest, recovery strategies may be developed by DFO staff or contractors and then posted to the SARA Public Registry for public comment, while in cases where there is substantial interest, formal recovery teams involving a diversity of interests and knowledge may be established to provide input into the recovery process. In the case of northern bottlenose whale, because of the overlap in terms of geography, stakeholders and management issues with the existing Gully Marine Protected Area, DFO has elected not to establish a recovery team. Rather, workshops will be held with the members of the Gully Advisory Committee and other interested parties to gather input on the recovery strategy.

DFO will be working to develop a draft recovery strategy based on outcomes of this workshop and past input received through related processes, such as the Gully Advisory Committee. Once prepared, the draft strategy will be presented back to workshop participants for review and comment at a subsequent meeting. After comments have been considered, a revised draft will be circulated for jurisdictional review by federal and provincial government agencies. Following jurisdictional review, the draft will be posted on the SARA public registry for 60 days for public comment. Comments will be considered, and then a final version will be posted on the Public Registry.

2.2 Discussion

At the workshop there were questions regarding the integration of this recovery strategy with other planning initiatives in the area and regarding the implementation of the strategy. It was indicated that there would be an attempt to link the recovery strategy to the Gully Marine Protected Area and the Eastern Scotian Shelf Integrated Management Initiative. Linkages with such initiatives will be discussed in the recovery strategy. Action plan(s) will be developed to describe the specific measures and activities required to implement the recovery strategy. Implementation will require collaboration among a variety of government agencies, stakeholders and other interested parties, and will involve working with other planning and management processes such as those mentioned above.

3.0 Ecology of the Northern Bottlenose Whale

3.1 Presentation

Lei Harris provided a presentation on the ecology of the northern bottlenose whale. The presentation was primarily a summary of the Recovery Potential Assessment (RPA) for this species, which was conducted by DFO Science in February, 2007. The Science Advisory Report generated from the RPA (DFO, 2007) should be referenced for additional information. Key findings of the RPA are as follows:

- The average population estimate for the 1988 to 2003 period is 163 individuals (95% confidence interval 119–214). There is no statistically significant trend in abundance.
- The Scotian Shelf population is highly aggregated and has been sighted most often in the deep waters of three underwater canyons, the Gully, Shortland Canyon, and Haldimand Canyon on the edge of the Scotian Shelf.
- The whales are thought to be year-round residents of the eastern Scotian Shelf but winter distribution is not well understood.
- Critical habitat for this population is characterised as waters of more than 500 metres in bottom depth in the canyons along the edge of the Scotian Shelf that provide access to sufficient accumulations of prey (*Gonatus* squid) to allow northern bottlenose whales not only to meet their individual caloric requirements but to socialise, mate, and rear their young.
- There is no evidence from the whaling records or sightings data to suggest that distribution has been reduced.
- The Gully, Shortland Canyon, and Haldimand Canyon appear to be critical habitat.
- Total allowable harm was calculated to be 0.3 animals per year using the Potential Biological Removal (PBR) methodology.
- Recovery targets are: a) stable or increasing population and b) current distribution should be maintained as a minimum.
- Northern bottlenose whales do not have a residence as defined by SARA.
- Potential threats include entanglement/bycatch in fishing gear, oil and gas activities and acoustic disturbance.

3.2 Discussion

During the discussions following the presentation by Ms. Harris, it was noted that there was substantial uncertainty in the data, especially the data on historic whaling. It is unclear, for example, whether the population has recovered from whaling removals. Due to this uncertainty it may be useful to look at data from other areas, such as Newfoundland and Labrador in particular, to gain a better understanding of the population and its current status. It was noted that there is active research being undertaken by DFO Newfoundland and Labrador, DFO Maritimes and Dalhousie University to attempt to fill in the data gaps. It was emphasized that it is important to continue to collect the data that will allow DFO to determine whether or not recovery targets are being met.

The importance of *Gonatus* squid as a prey item for the whale was noted and it was argued that a squid fishery targeting *Gonatus* could have indirect detrimental effects on the whale population. These effects should be considered should a squid fishery be proposed. There was also discussion regarding the applicability of the residence definition to northern bottlenose whales. Some participants suggested that the canyons that the whales occupy could be considered residences, but it was argued that these areas would be better suited to the definition of critical habitat, and could be equally well protected through the provisions for such habitat. This is consistent with DFO's interpretation of Residence in the Species at Risk Act.

4.0 Existing Protection and Conservation History

Paul MacNab outlined the measures that have been taken to date to protect and conserve the northern bottlenose whale. The following is a timeline of key milestones in the conservation history of the Scotian Shelf population:

- 1976 Northern bottlenose whale (NBW) is listed in IUCN Red Book as "vulnerable"
- 1977 International Whaling Commission identifies NBW as a "protected species"
- 1984 Sale and trade of NBW is banned by CITES
- 1990 A tanker exclusion zone for the Cohasset-Panuke oil project is established
- 1992 Parks Canada recognizes the special significance of Sable Island and the Gully
- 1993 COSEWIC designates NBW as "not at risk," but considers both Canadian populations as a single designatable unit.
- 1994 A DFO Whale Sanctuary is established in the Gully, which promotes voluntary avoidance measures for vessels traveling through the area.
- 1996 COSEWIC splits NBW in Canada into two populations— Labrador-Davis Strait and the Gully— and identifies the latter as "vulnerable"
- 1997 Oil and gas regulators and industry implement measures to protect northern bottlenose whales, such as withdrawal of the Gully from a call for bids for exploration, establishment of a Gully code of conduct whereby the canyon is excluded from transits and over-flights, and implementation of enhanced environmental assessments within 10km of the Gully.
- 1997 DFO conducts a Science Review of the Gully ecosystem
- 1998 A Marine Protected Area (MPA) pilot project for the Gully is established, providing interim protection
- 1998 The CNSOPB establishes a Gully Policy, whereby exploration licenses will not be issued in the candidate MPA.
- 2002 The United States identifies the Gully as an Offshore Biologically Important Area, excluding it from low-frequency active SONAR during peace-time.
- 2002 COSEWIC re-assesses the Gully population as endangered, and renames it the Scotian Shelf population.
- 2004 The Gully MPA is formally designated
- 2006 The Scotian Shelf population is added to Schedule 1 of SARA.

5.0 Limiting Factors

5.1 Presentations

The *Species At Risk Act* requires that recovery strategies include a description of the threats to the species in question that is consistent with the information provided by COSEWIC. Presentations were made by David Millar and Dr. Jack Lawson regarding natural and anthropogenic limiting factors for the northern bottlenose whale.

The Scotian Shelf population has a low birth rate and appears to be naturally small, possibly due to limited habitat availability on the Scotian Shelf. Because the population occupies the southern fringe of this species' distribution, the potential for alternative habitat to the south is restricted.

Eighty seven northern bottlenose whales were taken from the Scotian Shelf by whalers during the 1960s. No whales have been taken since a moratorium was introduced in 1972. Because pre-whaling abundance is not known, it is impossible to determine whether or to what extent the population has recovered from whaling.

There is evidence that northern bottlenose whales may be injured or even killed by entanglement or by-catch in fishing gear. There have been eight recorded entanglements in Atlantic Canada, three of which occurred off Newfoundland and five of which occurred on the Scotian Shelf. Several of these entanglements occurred in the silver hake and squid fisheries, which are no longer widely prosecuted around the whales' primary habitat. Three entanglements have been recorded in longline gear, involving both bottom and pelagic fisheries. At least one of the whales was released alive. It is possible that additional entanglements have occurred but were not observed or reported. Longline fisheries for groundfish and large pelagics continue to overlap with portions of bottlenose whale primary habitat, although all fisheries have been excluded from Zone 1 of Gully. Serious entanglements appear to be a rare occurrence, but the issue is not well understood.

Acoustic disturbance has been identified as a potential threat to the northern bottlenose whale and other cetaceans. Whales use sound to navigate, communicate and find prey. Anthropogenic noise can affect the whales' ability to use sound for these purposes, and can also result in a variety of other effects. These effects can range from masking of natural noises, to changes in behaviour, temporary or permanent hearing threshold shifts, physical injury, stranding and even mortality. The effect of a given sound source on whales depends on the intensity, frequency, duration, and proximity of the sound source, as well as bathymetry and other factors. Potential sources of marine noise include SONAR, oil and gas exploration and extraction activities, active acoustic research and shipping. SONAR has been implicated in fatal strandings elsewhere in the world, but low-frequency active SONAR is not currently in use on the Scotian Shelf. Mitigation measures can be put in place to reduce the potential effects of noise on marine mammals, but the effectiveness of some of these measures has not been tested. In general, the

effects of noise on marine mammals are poorly understood, and a precautionary approach is warranted.

According to COSEWIC "Oil and gas exploitation has the potential to harm the bottlenose whales directly through the noise of the drilling and other operations, spills and discarded material, but also indirectly because of an increase in shipping traffic" (Whitehead et al. 1996). Interest in oil and gas exploration on the Scotian Shelf peaked in the early 2000s and has since declined, but active exploration licences still exist in the vicinity of bottlenose whale habitat. The closest production facility to primary bottlenose whale habitat is about 40km away at the Venture field in shallow water.

Toothed whales tend to be susceptible to contamination due to biomagnification. Whales of the Scotian Shelf population appear to be more contaminated than those in the Davis Strait, but similar to other large toothed whales. These contaminant levels are not thought to be high enough to present a health concern. A new study (Hooker, in press) suggests that DDT levels in whales of the Scotian Shelf population increased between 1996 and 2003.

Ship strikes are a known source of mortality for some cetaceans, primarily baleen whales. However, they are not thought to be common in beaked whales, and the risk of vessel collisions with northern bottlenose whales is considered low. Vessels may, however, cause noise and possibly discharge pollutants in bottlenose whale habitat. Traffic levels in the primary habitat of bottlenose whales are low and voluntary avoidance measures are in place for the Gully.

5.2 Discussion

Questions were raised at the workshop regarding natural threats (i.e., predation) to bottlenose whales. It was indicated that killer whales are believed to be a predator of northern bottlenose whales, particularly juveniles. There have been reports of killer whales in the area off Cape Breton, and therefore, the potential for killer whale attacks on whales of the Scotian Shelf population exists. However there is no direct evidence of predation. It is also possible that sharks prey on young northern bottlenose whales.

It was indicated that there have been improvements in drilling operations for oil and gas recently to minimize the effects on the environment. Barite, which was previously used to weigh drilling muds, has been replaced with brine and there is zero discharge of oil-based muds.

It was suggested that there is evidence strandings can occur as a result of seismic activities. The importance of allocating resources for the examination of whales that have been stranded was stressed. It was noted that Nova Scotia has a non-profit marine mammal stranding network to respond to such events, but capacity is limited.

6.0 Recovery Goal, Objectives and Strategies

6.1 Presentation

The *Species at Risk Act* requires that each recovery strategy include a statement of the population and distribution objectives for the species under consideration. Typically, recovery strategies include a broad recovery goal that describes the desired outcome for the species, as well as specific recovery objectives, and strategies for each objective. Recovery goals generally fall on a continuum between survival at existing levels and full recovery to historical abundance.

The recovery goal for the northern bottlenose whale should be consistent with the recovery target recommended by the RPA: a stable or increasing population trend and maintenance of current distribution at a minimum. More detailed population and distribution objectives should also be identified if possible, but given the limited information on historic abundance and distribution of bottlenose whales on the Scotian Shelf, this may be difficult. Many recovery strategies also include objectives related to addressing threats and knowledge gaps. To the extent possible, recovery objectives should be specific, measurable, achievable, and time-bound. Strategies can be fairly general and should consist of broad approaches for addressing threats to the species and achieving recovery objectives.

A number of examples of goals, objectives and strategies from other recovery documents were presented at the workshop. Relevant examples can be found on the SARA public registry at <http://www.sararegistry.gc.ca>

6.2 Discussion

Questions were raised regarding the timeframe for the recovery goal. It was suggested that a 20 year timeframe would be reasonable, although for some species even longer-term goals may be required. The timeframe should reflect biological factors such as generation time. For example, in the case of right whales, the proposed goal is to achieve an increasing population trend over three generations. Generation time for northern bottlenose whales is approximately 8-13 years.

Some participants suggested that a goal of the recovery process should be to achieve de-listing of the species. It is typically not recommended that de-listing be used as the recovery goal, as decisions to de-list may depend on a variety of factors, some of which may not be directly related to the recovery of the species. There was concern that the northern bottlenose whale might never be de-listed, because it is thought to be a naturally small population and may always number fewer than 250 individuals (the COSEWIC threshold for endangered status). It was suggested by some participants that if there were no threats to the survival of the species, it should be de-listed despite the small population size.

6.3 Break-out group session on Recovery Goals, Objectives and Strategies

Participants were divided into four multi-sectoral groups to discuss recovery goals, objectives and strategies for the northern bottlenose whale. Each group included a facilitator from DFO. The following is a brief summary of the outcomes of each group.

Group 1:

The recovery goal should include the following elements:

- Stable / increasing population trend.
- Maintenance of current distribution.
- Reference to threats.

Recovery objectives and strategies should include:

Objective 1: Identify, evaluate and mitigate threats.

Strategies: Develop codes of conduct, evaluate fishing seasons, investigate gear loss, and examine scarring of individuals.

Objective 2: Characterize and identify critical habitat.

Strategies: Study diet, prey availability, controlling factors and habitat constraints.

Objective 3: Refine population estimates and improve understanding of distribution and range.

Strategies: Conduct surveys, use passive acoustic monitoring, study genetics and conduct tagging.

Objective 4: Education and stewardship.

Strategies: Target the public and marine user groups.

Group 2:

The recovery goal should be to maintain a stable or increasing population.

Objectives should include:

1. Determine if the Scotian Shelf population is distinct.
2. Increase understanding of northern bottlenose whale in Scotian Shelf waters, focussing research on distribution, genetic exchange, critical habitat and natural threats to recovery.
3. Maintain a precautionary approach or reduce the risk of harm due to human activities.

4. Develop and implement education and stewardship activities.
5. Evaluate success.

Strategies corresponding to the above objectives should include:

1. Continue genetic sampling and photo-identification.
2. Conduct cross-population acoustic monitoring, study distribution and abundance of prey, conduct fatty acid and stable isotope analysis of diet and compare biotic and abiotic features of the Gully with adjacent canyons.
3. Expand industry codes of practice and continue review of draft Statement of Canadian Practice on the Mitigation of Seismic Noise.
4. Create a compendium of education and outreach materials.
5. Review success of goal at five year intervals.

Group 3:

The following recovery goal is suggested for this population:

A stable or increasing population trend, at a minimum maintenance of current distribution, and active management measures to reduce known and potential threats.

Objectives and strategies are proposed as follows:

Objective 1: Monitor the population size, trend and distribution.

Corresponding Strategies:

- Continue photo-identification such that a population trend can be calculated with precision of +/- 5%.
- Investigate acoustic methods of monitoring northern bottlenose whales.
- Routinely monitor presence of northern bottlenose whales in all three canyons.
- Collate information on bottlenose whales in surrounding areas.

Objective 2: Improve our understanding of northern bottlenose whales including critical habitat, carrying capacity, breeding, trophic interactions, links with other populations, mortality, etc.

Corresponding Strategies:

- Increase capacity to respond to and investigate strandings.
- Undertake studies of squid in the Gully.
- Examine photo-identification data from all three canyons to investigate reproduction and movement.
- Investigate acoustic methods of monitoring northern bottlenose whales.

Objective 3: Improve understanding of fishing gear interactions and reduce if necessary.

Corresponding strategies:

- Investigate and monitor the spatial distribution of fishing gear in bottlenose whale habitat.
- Increase observer coverage for vessels operating in and around bottlenose whale habitat.
- Develop protocols for disentanglement.
- Conduct enhanced assessments of new or returning fisheries.
- Consider additional spatial management measures.
- Investigate gear modifications and mitigation.

Objective 4: Reduce anthropogenic noise in northern bottlenose whale habitat.

Corresponding Strategies:

- Consistently monitor noise in known habitat.
- Identify and manage sources of noise.
- Investigate management thresholds for marine noise.
- Conduct enhance environmental assessment for activities producing noise in habitat and adjacent areas.

Objective 5: Monitor and improve understanding of tourism and research and manage if necessary.

Corresponding Strategies:

- Monitor and track tourism and research activities in northern bottlenose whale habitat.
- Use experience from other species to develop protocols for research and tourism.

Objective 6: Monitor levels of contaminants in whales and their environment and investigate pathways of effects.

Corresponding Strategies:

- Obtain samples from ~15 animals every 5-10 years or develop an alternative systematic methodology.
- Establish a tissue bank so that contaminant levels can be compared over time.
- Investigate potential sources and routes of contaminants.
- Monitor water and sediment quality in the whales' habitat.

Objective 7: Ensure that human-induced mortality remains below PBR.

Corresponding Strategies:

- Track human induced mortality, including through enhanced response to strandings.
- Take corrective action if mortality approaches or exceeds PBR.

Objective 8: Education and Stewardship

Corresponding Strategies:

- Develop resource materials.
- Distribute to stakeholder groups.
- Develop school programs.

Group 4:

The goal for the recovery of the northern bottlenose whale should be “to achieve a long-term viable population of NBW on the Scotian Shelf.”

Objectives should include:

1. Develop and implement education activities that support bottlenose whale recovery by piggybacking on initiatives for other species, targeting public and stakeholders.
2. Increase understanding of NBW in Atlantic Canadian waters, including demographic patterns, habitat capacity, population size, migration, movement and linkages in Atlantic Canadian waters.
3. Monitor population trends and threats.
4. Identify, understand, quantify and mitigate threats.
5. Promote collaboration between government, stakeholders, the public and scientists.

Research strategies are proposed as follows:

1. Improve accuracy of population estimates (previous estimates highly variable).
2. Improve understanding of distribution.
3. Investigate habitat capacity.
4. Study relationships between populations.
5. Monitor population in a regular and systematic way.
6. Determine what would constitute a viable population.

Strategies for addressing threats are proposed as follows:

1. Noise: Monitor and improve understanding of effects.
2. Fishing entanglement: Investigate how entanglements occur and develop disentanglement procedures based on experience with other species.
3. Contaminants: Improve understanding of sources and monitor contaminant levels in habitat and in whales.

Trends in the population and de-listing could be considered indicators of success.

7.0 Conclusions and Next Steps

Generally, the outcomes of the break-out group session reveal strong agreement among stakeholders regarding recovery goals, objectives and strategies for this population. Most groups favoured a recovery goal consistent with the targets identified by the RPA. All of the groups identified addressing knowledge gaps as an important step in the recovery process. Managing threats and engaging stakeholders and the public were also identified as important. Although there was some divergence around the specific steps needed to achieve recovery objectives, the recommendations were mostly consistent across groups.

The results of the workshop will be incorporated into a draft Recovery Strategy by DFO staff over the coming months. In the few instances where there were divergent views among participants, the Recovery Strategy may present multiple options, discuss the advantages and disadvantages of various courses of action or simply acknowledge and explain the lack of consensus. The draft document will be presented to workshop participants and other stakeholders once completed, likely late this fall, after which a second workshop will be held to review and discuss the draft Strategy. There may also be directed consultations with certain sectors if deemed necessary. Following the second workshop, the document will be revised as necessary, submitted through the appropriate review and approval process, and then posted as proposed to the SARA Public Registry for a 60 day comment period. Comments will be incorporated as appropriate, and then the final Recovery Strategy will be posted, followed by action planning and implementation.

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Appendix 1: List of Participants

Surname	Name	Affiliation
Atkinson	Troy	Nova Scotia Swordfishermen's Association
Boudreau	Cyril	Nova Scotia Department of Fisheries and Agriculture
Cochrane	Norm	DFO Maritimes
Doane	Kim	NS Energy
Facey	Amanda	Maritime Aboriginal Aquatic Resources Secretariat
Fenton	Derek	DFO-Maritimes
Gowans	Shannon	Eckherd College
Gravel	Caroline	Shipping Federation of Canada
Hall	Tim	DFO-Maritimes
Harris	Lei	DFO-Maritimes
Herbert	Glen	DFO-Maritimes
Hunka	Roger	Maritime Aboriginal Aquatic Resources Secretariat
Hurlburt	Melanie	DFO-Maritimes
Hurley	Geoff	Hurley Environment Ltd
Jodrey	Shalan	Bear River First Nation
Lawson	Jack	DFO-NL
Lugar	Jay	Seafood Producers Association
MacCaull	Garry	Transport Canada
MacNab	Paul	DFO-Maritimes
McNeely	Josh	Maritime Aboriginal Aquatic Resources Secretariat
Millar	David	DFO-Maritimes
Moors	Hilary	Dalhousie University
Osborne	Derek	DFO-NL
Parrot	Russ	Geological Survey of Canada
Robichaud-Leblanc	Kimberly	DFO Maritimes
Scratch	Sarah	NS Energy
Shulz	Tyler	Ecology Action Centre
Thillet	Marielle	Encana
Vardy	Beth	CNSOPB
Whitehead	Hal	Dalhousie University
Wimmer	Tonya	WWF Canada
Worcester	Tana	DFO-Maritimes